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IRON MINES IN KANSU

By Li Hsiao-ou

Industrialization is the basic objective in building the Northwest economy, and this depends chiefly on mineral resources. Of these the Northwest has an abundance, but unfortunately they are little developed. Coal and iron are the backbone of heavy industry. In postwar economic recovery the rich resources of the Northwest should be used in developing defense industries. Kansu is rich in minerals: the iron of Ch'eng and Hui, the coal of Lan-chou, Yung-teng and Ching-ning, the petroleum of Yü-men, and other minerals yet unexploited. These should all be surveyed and exploited not merely to improve living conditions, but also for national defense.

In 1940 the four government banks through their branches in Lan-chou organized a Kansu Mineral Survey Office. Iron prospectors were sent throughout the areas of Lan-chou and Yung-teng for preliminary surveys. In May 1941 the Kansu provincial government organized several investigating parties for further study, which reported numerous localities where iron mines could be profitably worked. These are found chiefly in the nine hsien of T'ien-shui, Hui, Ch'eng, Liang-teng, Li, P'ing-liang, Ning-t'ing, Kao-lan, and Yung-teng. Many of these spots have been worked intermittently by primitive methods.

Mines have been worked in T'ien-shui Hsien, but the veins are thin and the quality is poor, while fuel for smelting is scarce.

Hui Hsien contains many outcrops of ore, which have from 40 to 50 percent iron content. However, these are mostly in rugged terrain with poor facilities for transport. Some old pits are being reworked with better methods.

Ch'eng Hsien, like the foregoing hsien, contains many outcrops of hematite and other ores, with high percentages of iron; but this hsien also is

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very rugged, heavily [illegible]
Some furnaces are in operation in this hsien, the product mainly going into farm tools.

In Liang-tang there are many outcrops of high-quality iron ore about 100 km south of the hsien seat. The altitude here is about 6,000 feet, and the terrain is rugged. A furnace has been set up at Shang-chia-ho about 10 km from one of the larger mines.

In Li Hsien there is a famous iron mountain, some 80 km south of the hsien seat. Around this mountain for 10 km or more are numerous outcrops with 50 percent and more iron content. The locality is heavily forested so there is plenty of timber, and good coking coal is found in Wu-tu Hsien only 80 km distant. Mining and smelting can be done in this county on a large scale. Its iron-ore reserves are estimated at 5 million tons.

Iron ore in P'ing-liang Hsien is found in two forms, in nodules in Permian shales, not worth working, and in metamorphic, sedimentary, weathered beds. These beds are generally accessible. Those at Erh-tao-kon are closely associated with coal deposits, and when the latter are opened up, may prove profitable for working.

The An-k'ou-yao district, some 40 km southeast of the Hua-t'ing Hsien seat, is famous for its potter's clay and large reserves of coal. With these are associated iron-ore beds of 30 percent iron content. These beds cannot be worked profitably unless the magnetic method is applied. However, if the coal does not coke, the primitive Shansi method might be used. This method consists in making hollow clay cylinders some 2 feet long and 6 inches in diameter, and filling these with bits of iron ore. Sixty-four of these cylinders are placed in two layers in a rectangular furnace, which is covered with broken tile. A hot fire below, by a vigorous use of the bellows, produces liquid iron in about 24 hours. Because of the present urgent need for raw materials, it is better to use primitive methods than to let the beds lie idle.

Kao-lan Hsien has good quality iron-ore beds about 105 km north of Lanchou which are easily accessible. A sample analysis shows a percentage of 57.77 pure iron. Other ingredients for smelting are found nearby.

The largest iron deposits in Yung-teng Hsien are found at Yao-chieh, about 60 km southwest of the hsien seat. These are estimated at possibly 2 million tons, containing 36.48 percent iron. According to the studies of Huang Chi-ch'ing, the quality of this ore is not inferior to that of Wei-yuan in Szechwan, and other needed materials such as bituminous coal, limestone, and fire-resistant clay are found nearby. He suggests an ore-reduction plant at Yao-chieh, using small furnaces such as have been found successful in Szechwan. If such a plant were located in the Ta-t'ung Ho valley, it could become the industrial center of the northwest.

Iron is found in other localities in this hsien, but not in paying quantities.

Numerous scattered outcrops are found in other parts of the province, notably a high-quality deposit in Lo-ta-li, Min Hsien, where transportation is difficult.

Known reserves of iron ore in Kansu may be listed as follows:

Locality	Amount (in tons)
T'ien-shui	50,000
Hui Hsien	360,000
Ch'eng Hsien	25,000
Liang-tang	114,000
Li Hsien	5,000,000
P'ing-liang	294,450
Hua-t'ing	2,233,820
Kao-lan	1,500,000
Yung-teng	3,000,000
Other places	1,000,000
Total	12,627,270

Conclusion

The scarcity of iron in the Northwest is more serious than that of coal. Before the war, the entire region depended on Shansi; during the war it had to look to Shensi for crude iron. The principal iron deposits in Kansu are in the eastern part, where large reserves of high quality ore are found containing about 50 percent pure iron. However, because transportation is poor, most of them have not been opened up, and cannot be used. According to Huang Chi-ch'ing, the Northwest not only lacks mines to supply modern smelters, but also coking coal within easy transport range. Only at Yao-chieh, in Yung-teng Hsien, is there a place centrally located with transportation facilities, abundant coal, and a good number of iron mines. He proposes using small furnaces. New-type equipment is not easy to install now. It is better to develop on a modest scale, using improved local methods. Meanwhile careful studies and extensive surveys should be kept up, because of the importance of iron mining in economic reconstruction.

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